

Form Approved
OMB No. 0704-0188

1. REPORT DATE (DD-MM-YYYY)

3. DATES COVERED (From - To)

5a. CONTRACT NUMBER

FC4611-99-L-0025

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER	
----------------------------	--

5d. PROJECT NUMBER

DARP

5e. TASK NUMBER	
-----------------	--

A205

5f. WORK UNIT NUMBER

8. PERFORMING ORGANIZATION REPORT

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S NUMBER(S)	
------------------------------------	--

Approved for public release; distribution unlimited.

14. ABSTRACT

20021212 123

16. SECURITY CLASSIFICATION OF:

18. NUMBER OF PAGES

19a. NAME OF RESPONSIBLE PERSON

Leilani Richardson

a. REPORT

b. ABSTRACT

c. THIS PAGE

Unclassified

Unclassified

Unclassified

19b. TELEPHONE NUMBER
(include area code)

(661) 275-5015

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

5 separate items enclosed

DARPA 205

MEMORANDUM FOR PRS (In-House / Contractor Publication)

FROM: PROI (STINFO)

18 June 2002

SUBJECT: Authorization for Release of Technical Information, Control Number: **AFRL-PR-ED-AB-2002-146**
Karl Christe (ERC) et al., "Synthesis and Structural Characterization of Nitrogen Containing High
Energy Density Materials" (abstract only)

Int'l Congress, Int'l Union of Crystallography
(Geneva, 6-15 August 2002) (Deadline = 14 July 2002)

(Statement A)

1. This request has been reviewed by the Foreign Disclosure Office for: a.) appropriateness of distribution statement, b.) military/national critical technology, c.) export controls or distribution restrictions, d.) appropriateness for release to a foreign nation, and e.) technical sensitivity and/or economic sensitivity.

Comments: _____

Signature _____ Date _____

2. This request has been reviewed by the Public Affairs Office for: a.) appropriateness for public release and/or b) possible higher headquarters review.

Comments: _____

Signature _____ Date _____

3. This request has been reviewed by the STINFO for: a.) changes if approved as amended, b) appropriateness of references, if applicable; and c.) format and completion of meeting clearance form if required

Comments: _____

Signature _____ Date _____

4. This request has been reviewed by PR for: a.) technical accuracy, b.) appropriateness for audience, c.) appropriateness of distribution statement, d.) technical sensitivity and economic sensitivity, e.) military/national critical technology, and f.) data rights and patentability

Comments: _____

APPROVED/APPROVED AS AMENDED/DISAPPROVED

PHILIP A. KESSEL
Technical Advisor
Space and Missile Propulsion Division

Date

Synthesis and Structural Characterization of Nitrogen Containing High Energy Density Materials

Ashwani Vij, Karl O. Christe, Vandana Vij, William W. Wilson, Fook S. Tham,
Ralf Haiges, Michael Gerken and Xiongzhi Zhang

Propulsion Directorate and Advanced Concepts Division, Air Force Research
Laboratory, Edwards Air Force Base, CA 93524, Loker Hydrocarbon Research
Institute and Department of Chemistry, University of Southern California, Los
Angeles, CA 90089 and Department of Chemistry, University of California,
Riverside, CA 92521

Polynitrogen compounds are of great interest as High Energy Density Materials (HEDM). Single crystal x-ray crystallography plays a crucial role in the characterization of these materials and their precursors. In this paper, we report the crystal structures of the novel N_5^+ cation in $N_5^+ Sb_2F_{11}^-$, which is the first stable polynitrogen species to be discovered in a century since the discovery of the azide ion. The other HEDM materials synthesized and characterized are $N_2F^+ M_xF_{2x+1}^-$ ($M = As$ or Sb), $NOF_2^+ AsF_6^-$, $NF_4^+ Sb_2F_{11}^-$, $NH_3F^+ SO_3CF_3^-$, $M(N_3)_3$ ($M = As$ or Sb) and $SbCl_x(N_3)_{6-x}$ ($x = 2$ or 4). In the case of oxofluorides, oxygen fluorine disorder is frequently encountered and a new method for obtaining valuable structural information from disordered structures is briefly discussed for the NOF_2^+ cation. The techniques employed for handling these energetic materials for x-ray diffraction studies will also be described.

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited